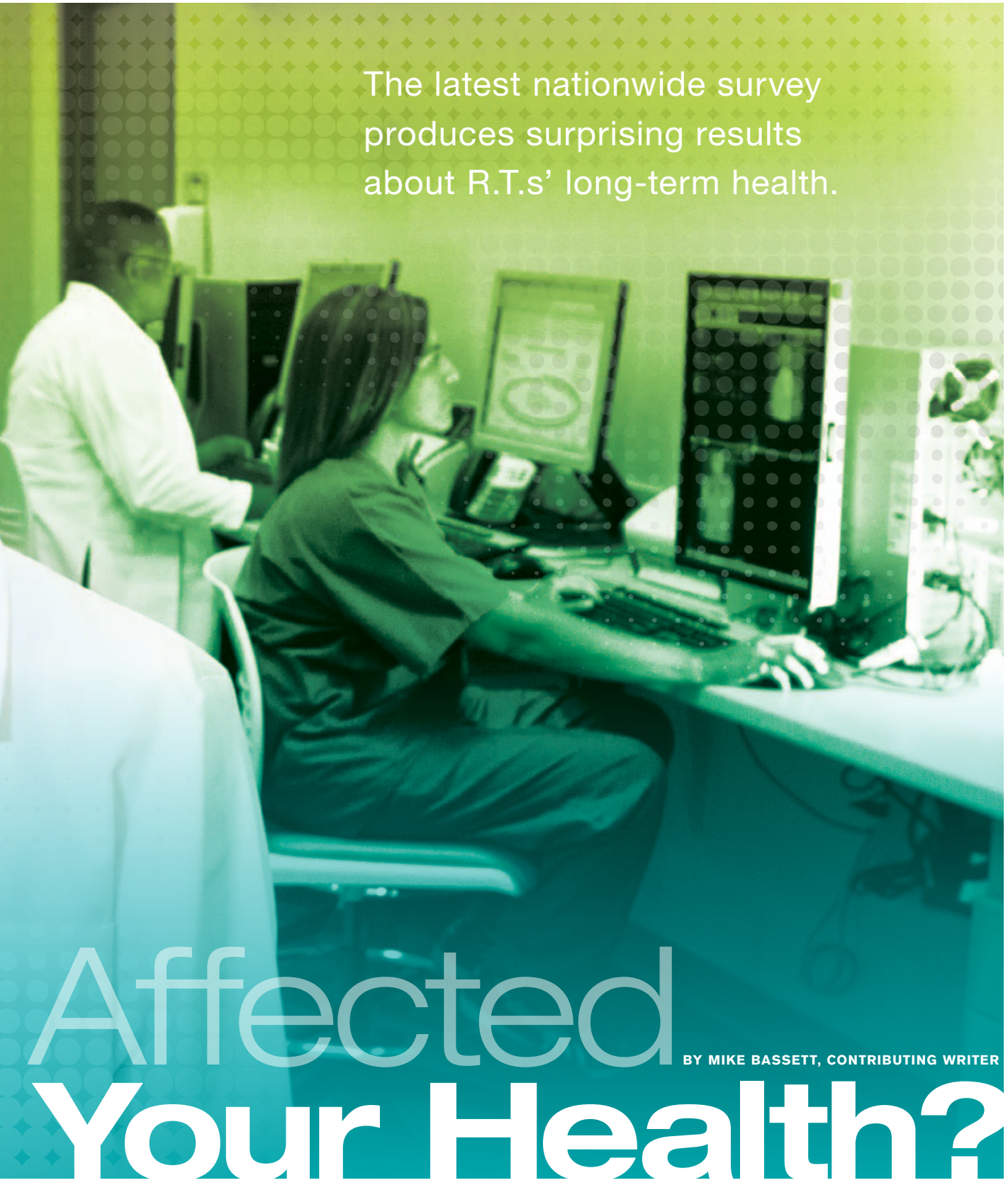
Has Your Job

IMAGE: MICHAEL MCDERMOTT



The latest nationwide survey produces surprising results about R.T.s' long-term health.

Affected Your Health?

BY MIKE BASSETT, CONTRIBUTING WRITER

Bette Schans, Ph.D., R.T.(R), FASRT, is nothing if not honest. Before charting a different career path as an educator, Bette spent 21 years as a practicing radiologic technologist — one who, in her own words, "did some really stupid things" when it came to protecting her own safety.

"I wasn't always the best at shielding myself properly," said Bette, a professor of radiologic science at Colorado Mesa University in Grand Junction, Colo. And as someone who had a bout with breast cancer in 2003, she said now she tells her students that she "can't rule out the possibility that not being smart with radiation protection could have had some relationship with my cancer."

So Bette is unapologetic about "getting up on my soapbox" to talk about radiation safety.

She also pays close attention to the U.S. Radiologic Technologists Study — a collaborative effort of the University of Minnesota School of Public Health, the National Cancer Institute and the American Registry of Radiologic Technologists — to study the potential radiation-related health effects among the more than 146,000 R.T.s (of which Bette was one) first surveyed in 1982.

Over the years, researchers have extensively studied levels of radiation. One obvious group of subjects was the survivors of the atomic bombings of Hiroshima and Nagasaki. But as the University of Minnesota's lead investigator, Bruce Alexander, Ph.D., pointed out, this group represents a single point of radiation exposure to a very large population, while radiologic technologists represent something entirely different.

"It's a unique population available for long-term follow up," said Bruce. "It probably can't be duplicated anywhere else."

Unlike the atomic bomb survivors, R.T.s undergo potential exposure to different types of radiation in low doses over a period of years. "While the given dose in any one year is extremely low, could the opportunity for significant exposure over a period of time have any long-term effect?" he asked.

Another unique aspect of this population is that it is made up primarily of women (more than 70 percent), which gives researchers an excellent opportunity to study the effects of low-level radiation exposure on certain diseases, such as breast cancer.

Three surveys have been conducted so far — the first one in 1982, the second in 1993 and the third in 2003. Why the prolonged amount of time between surveys?

According to Bruce, the researchers are particularly interested in how many health events occur within the survey population. "And a lot of these events we look at are very rare, so we need a number of years to

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pass for enough data to accrue to make it worth doing," he said. Cost is involved as well — two short surveys are much more expensive than doing one long survey.

The first and second surveys went out to R.T.s who had been registered technologists for at least two years before 1982 (going all the way back to 1926). When researchers designed the third survey, they decided to target R.T.s who had filled out at least one of the two original surveys "so that we would have some baseline information that we could follow up on," Bruce said.

The University of Minnesota researchers along with the ARRT and NCI collaborated on compiling the surveys, although the ARRT's participation in the survey development is less extensive than it was originally, said ARRT Executive Director Jerry Reid, Ph.D.

"Early on we had more input because they (the University of Minnesota team) were just learning about the profession," said Jerry. "Now, having worked on it for as long as they have, they are certainly sensitive to what questions should be asked and how they should be phrased." He added, "We're definitely committed to the partnership on this important effort."

Putting together the survey is akin to making sausage, Bruce joked — it's better if you don't see it being made.

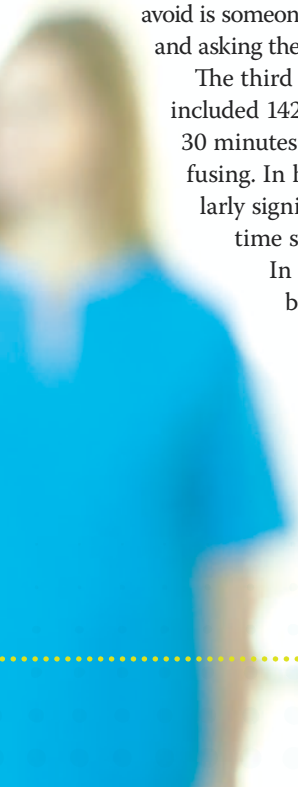
Each survey is designed to extract certain kinds of information from the study population, Bruce said, so questions are as detailed as possible, "without making them too confusing." A draft survey is drawn up, tested, retooled and tested again.

"It's complicated," Bruce said. "What we're trying to avoid is someone receiving the survey, getting confused, and asking themselves, 'what are they really asking me?'"

The third survey in 2003 was 20 pages long and included 142 questions. Bette recalled it took about 30 minutes to complete and wasn't difficult or confusing. In her case, the third survey was particularly significant because it took place around the time she was diagnosed with breast cancer.

In a follow-up, she was asked to provide a blood sample.

Since 1998, in addition to sending out surveys, the study has been collecting blood samples from participants with and without cancer to study the role genetics plays with cancer and radiation exposure. As of 2011, the study received more than 9,000 samples from radiologic technologists.



What does the survey show?

The ARRT includes yearly updates on the study that go out to each of its 300,000 registered technologists (including those who don't participate in the study). You can find information about the survey at radtechstudy.nci.nih.gov.

A look at the site demonstrates the wealth of data the study has made available to researchers over the years. For example, by clicking through the link to the study's scientific highlights section you can access dozens of studies and reviews that have incorporated data from the surveys, including:

- **Mortality studies**
- **Incidence studies**
- **Molecular and genetic studies of breast cancer**
- **Molecular and genetic studies of thyroid cancer**
- **Occupational radiation dosimetry**
- **Personal medical radiation dosimetry**
- **Ultraviolet radiation dosimetry**
- **Biodosimetry**

As for general conclusions about the health of R.T.s, this study group is pretty healthy — healthier than the general population, said Bruce, although people working in the early years of the profession had elevated risks for breast cancer.

"That wasn't surprising, but it was notable," Bruce said. "In a population of mostly women, does that risk continue if we follow them long enough? That's one of the questions we want to clarify. What is good to see is that across the board there aren't any surprising findings regarding more cancers in this population."

Bruce added that researchers have cooperated with other large studies on breast and thyroid cancer to look

at potential genetic determinants. This work has resulted in several potentially useful findings.

The survey also has become useful in advancing research into whether vitamin D levels can prevent cancer and other diseases. Because the R.T.s in the study represent a nationwide sample, they help in studying whether differences in exposure to sunlight (depending on geographic location) has an impact in this area.

So how do R.T.s like Bette Schans feel about the survey and the safety of the profession they've followed for the past 40 or 50 years?

Lois Lehman, R.T.(R)(CT), is assistant director of radiology at the Texas Scottish Rite Hospital in Dallas. She has worked in the profession since she entered a hospital-based program in 1966 when she was 18 years old.

> **By participating in the survey she was providing information that would be useful for future generations of R.T.s.**

"I never really thought that being an R.T. would affect my safety or health," she said. "I respected but I didn't fear radiation. As students wearing film badges, we quickly saw that our radiation dosimetry readings were very low and that the R.T.s I studied under had very low dosimetry readings."

Lois said that she believed from the start that by participating in the survey she was giving information that would not immediately benefit her or her fellow R.T.s but would help future generations of R.T.s. She has reviewed the results of the surveys over the years and feels confident that "my profession is safe."

Norm Hente, M.S., R.T.(R), FASRT, entered the profession back in the 1960s and worked at the Mallinckrodt Institute at Washington University in St. Louis for 32 years. After a short interlude rehabilitating a house, he returned to frontline radiology at Christian Northeast Hospital in St. Louis, where he worked until 2007.

During his training he took academic courses in anatomy, physiology and radiation physics, so he believes he was well versed in the potential risks of radiation.

"I never really had a concern about it, except that in the early days it was very common for us to hold patients (during examinations), particularly if you were working in pediatrics," Norm said. "We didn't really have a lot of creative ways of dealing with that issue at that time — we just did what we needed to do and got the pictures.

"But I did wear my badge all the time," he added. "There was never any doubt about that."

Attitudes toward safety have increased "dramatically" since he first entered the profession," Norm said. "I think a lot of that has to do with the fact our educational programs have really improved." He also noted that R.T.s now work with better safety equipment, from lead aprons to thyroid shields.

Norm said he is gratified that the survey was undertaken in the first place, since "no one was following up on the potential harm radiation posed for technologists at that time." He also is relieved the survey results show that R.T.s as a whole remain a relatively healthy group, "so it's good to know that we are doing the things we need to do to avoid problems."

As safe as the profession appears to be, it could be safer, said Bette.

She has been teaching radiation safety and protection to her students for 17 years and, from what she hears in the classroom, fears that technologists are too lax when it comes to safety.

"I have students each year who tell me that they see some technologists taking off aprons, or not wearing a badge," Bette said, adding that familiarity with the work environment in some cases has resulted in a false sense of security.

"We've known about the dangers of radiation for years, but it seems like we always think of it on a grander scale — the atom bombs, Chernobyl or things like that — so we don't worry about an abdominal x-ray," she observed. "But, as workers we need to be aware that we are being exposed to scatter radiation all the time and that when we wear shielding or step away when we can, we lower the chances of something bad happening."

Do Your Part

R.T.s who have participated in the U.S. Radiologic Technologists Study will soon receive a package in the mail — the fourth survey questionnaire. Watch your mail for the 2012 survey later this spring.

This one will focus on several areas, such as updating health outcomes in the study population. "We're also taking a lot more interest in personal radiation exposure, which has become quite controversial in the last few years," said University of Minnesota lead investigator Bruce Alexander, Ph.D.

In addition, researchers will follow up on a subset of the R.T. population who have had particular kinds of jobs, such as those involving fluoroscopically guided procedures or nuclear medicine, that have become more common over time.

Bruce said the research team expects to send out between 90,000 and 95,000 surveys, a total representing the number of R.T.s who participated in the first two studies and are believed to be alive.

The participation rate for these surveys has always been "phenomenally high," averaging about 70 percent, said ARRT Executive Director Jerry Reid, Ph.D. "It reflects the high level of interest within the community in the project itself and the interest in the impact of low dose ionizing radiation."

Bruce agreed that this has been an "interested and active" population, but also worries that participants retiring or leaving the profession will think their information is no longer useful. "So we are trying to encourage people who have retired or have left the profession to continue to take the survey," he said. "Their information is every bit as important as the information we get from those who are still working."

Find out about the study at radtechstudy.nci.nih.gov